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Direct Inference Instruction: The Effects on Fourth Grade Students' Reading Comprehension and Motivation

BY

Kalee Bengtson

THESIS

SUBMITTED IN PARTIAL FUFILLMENT FOR THE REQUIREMENTS
FOR THE DEGREE OF

Master of Science in Elementary Education

IN THE GRADUATE SCHOOL, EASTERN ILLINOIS UNIVERSITY
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Dedication

To my family who support me in all I do. To Brad who has stood by me and helped to keep me focused throughout the whole process of this thesis. To my mother who instilled a love of reading in me and who continually encouraged me to pursue my goals. To all teachers who do what they can to see their students succeed.

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Abstract

This research investigated student motivation and comprehension when an inference strategy was explicitly taught to fourth-grade students. Students in the experimental group (n=18) received instruction in an inference strategy developed for the purpose of this study that was based upon the five-step inference strategy created by Fritschmann, Deshler, and Schumaker (2007). Scaffolding instruction, the teacher modeled questioning the text and answering questions using a graphic organizer. After the teacher modeled the process, students worked in groups to read the text, question the text, make inferences, and answer questions at the end of the text. Finally, students completed the process independently when they had gained an understanding of the process and had acquired the necessary skills. Students in the control group (n=15) received standard comprehension instruction using the same texts as those in the experimental group. Student comprehension gains were assessed using the Measure of Academic Progress (MAP) as well as listening comprehension passages from an Informal Reading Inventory. Motivation was assessed using the Elementary Reading Attitude Survey before and after implementation of the strategy. Anecdotal notes were used to assess comprehension as well as student motivation.

Students in the experimental group showed an increase in overall comprehension as well as in multiple categories of comprehension. Although there was an increase in comprehension, it cannot be stated with certainty that the results were significant. In addition, students showed a slight increase in motivation; however, the results were not found to be significant.

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Chapter One

Introduction

Importance of Study

The National Institute of Child Health and Human Development (2001) states that good readers are active and purposeful readers. A lack of either of these qualities will cause a reader to falter at some point within the reading process. Although a student might be successful in responding to literal questions following a text and be identified by the teacher as a successful reader, the student might struggle with making inferences while reading the same text. As a specific example of this possible deficit in comprehension, specifically making inferences, the researcher noted the results of an Informal Reading Inventory assessment of a third-grade student depicting this discrepancy. With that individual in mind, the research was initiated to explicitly teach students to make inferences while reading, and to assess the impact that this instruction might have on elementary students.

For purposes associated with this study, reading is framed by Wixson, Peters, Weber, and Roeber's belief that "Reading is the process of constructing meaning through the dynamic interaction among the reader, the text, and the context of the reading situation" (1987, p. 750). It is necessary that students be given opportunities to discover the meaning of a text. According to the National Institute of Child Health and Human Development (2000), "Comprehension is an active process that requires an intentional and thoughtful interaction between the reader and the text" (p. 13). Literal comprehension is important, however, authors do not always explicitly state the intended meaning. In order for the reader to comprehend all meaning he or she must connect prior

knowledge with the text to make inferences (Allen, 1985). When students are passive readers and do not actively apply their prior knowledge and experiences to the text, meaning is lost.

Research shows that explicit instruction of comprehension strategies can be "highly effective in enhancing understanding" (National Institute of Child Health and Human Development, 2000, p. 14). Effective explicit instruction consists of direct explanation, modeling, guided practice, and application (National Institute of Child Health and Human Development, 2001). Many elementary students do not connect their prior knowledge with the text to make inferences without explicitly being told to do so. It is imperative that teachers recognize the importance of teaching students to make inferences while reading as well as provide students with specific comprehension strategies that foster the ability to infer when reading. The National Institute of Child Health and Human Development (2001) reported that teaching comprehension strategies helps students "become purposeful, active readers who are in control of their own reading comprehension" (p. 41). When students are introduced to strategies that can help them comprehend a text and aid their learning, "they are more likely to be motivated and involved actively in learning" (National Institute of Child Health and Human Development, 2001, p. 47).

Both the reports of the National Institute of Child Health and Human Development (2000 & 2001) report not only that explicit comprehension instruction is an important aspect of literacy education, but also that there are specific areas of reading comprehension instruction that teachers should address to better aid their students. Comprehension monitoring, cooperative learning, use of graphic organizers, question

answering, question generation, story structure, and summarization are all types of instructional strategies that should be implemented throughout the reading process. Based on reports by the National Institute of Child Health and Human Development (2000 & 2001), a strategy was developed by the researcher that explicitly taught inferential comprehension using many of the instructional components that were recommended to be included when teaching reading.

Problem Statements

1. Does explicit inference instruction improve students' reading comprehension?
2. If students show improvement in reading comprehension, what areas show the greatest improvement?
3. Do struggling readers show greater improvement with inference instruction than good readers?
4. Does inference instruction increase students' motivation and interest in reading?

Research Hypotheses

1. Students will show improvement in their overall reading comprehension abilities after receiving explicit inference instruction.
2. Students' reading will improve in multiple areas of comprehension including making inferences, noting details, and generating the main idea.
3. Students who do not show awareness of inferential thought before implementation of explicit inference instruction will show greater improvement following the strategy than those who show awareness of inferential thought before implementation of the strategy.

4. Students' interest and motivation will increase following implementation of inference instruction.

Definition of Terms

Active Reading – Transforming information from a text into existing knowledge and experiences in order to comprehend the text (Harris & Hodges, 1995).

Comprehension –An active process that requires an intentional and thoughtful interaction between the reader and the text (National Reading Panel, 2000, p. 13).

Metacognition – Awareness of mental processes that are used and the ability to regulate and direct such processes to a desired end (Harris & Hodges, 1995).

Passive Reading – Not transforming information from a text into existing knowledge and experiences in order to comprehend a text.

Prior Knowledge – Knowledge that comes from students' previous experiences, which aids comprehension (Harris & Hodges, 1995).

Scaffolding – The gradual decrease in the level of support provided by teacher to a student in learning (Harris & Hodges, 1995).

Strategy – A systematic plan that is implemented to improve students' performance in reading (Harris & Hodges, 1995).

Struggling Readers – Students who read below their current grade level.

Striving Readers – Students who read below their current grade level.

Assumptions

The following assumptions will underlie this study:

1. The impact of direct inference instruction is a worthy research topic.
2. Inferring is an important skill that impacts students' ability to comprehend a text.

3. Fourth grade students will complete the Measures of Academic Progress to the best of their ability.
4. Students' scores on the Illinois Standards Achievement Test are an accurate representation of their reading abilities.
5. Fourth grade students will answer comprehension questions from the Informal Reading Inventory to the best of their ability.
6. Fourth grade students will complete the Elementary Reading Attitude Survey items to the best of their ability and as honestly as possible.
7. The classroom teachers will implement instruction to the best of their ability with fidelity.

Limitations

The following limitations of this study include:

1. The sample size (n=33) limits the generalizability of the results to other students and classrooms.
2. The implementation of the research study in a rural school district limits the generalizability of the results to other, larger school districts.
3. The use of fourth grade students limits the generalizability of the results to other grade levels such as second grade.
4. The focus on comprehension limits the generalizability of the results to other areas of reading such as vocabulary development.
5. The focus on making inferences limits the generalizability of the results to other areas of comprehension such as cause and effect.

Chapter Two

Review of Literature

Improving reading comprehension is a task most teachers focus on throughout the school year. Many strategies are put into place to help students develop better comprehension skills, but inference training is often overlooked (Parker & Hurry, 2007). Direct inference instruction can benefit students in numerous ways, helping them become more successful readers. Making inferences is something children do in their daily lives, and although it is necessary for reading comprehension, it is often not transferred to the classroom setting. There are specific steps for teachers to take when teaching inference skills and research shows that proper inference instruction can help students, especially striving readers, to become more successful in the reading process (Hanson & Pearson, 1983).

Inferential Comprehension

When reading a story, all information is not explicitly stated; authors expect their readers to fill in the missing pieces while reading nearly any form of text. Good readers do this by connecting their prior knowledge with the information the author explicitly states to develop an interpretation of what the author is indicating in the text (Brassell & Rasinski, 2008). True and full comprehension of a text cannot occur without the reader making inferences; readers must interpret or attach meaning to what the author has stated. Miller (2002) states, "When readers infer, they use their prior knowledge and textual clues to draw conclusions and form unique interpretations of the text" (p. 107). Readers cannot passively read a text and expect to understand all that the author has implied. Each reader should be weaving his or her own prior knowledge with the text to make

proper inferences (Allen, 1985). Furthermore, students must be active participants in the reading process in order to comprehend the text. As Pearson (1985) states:

> No text is ever fully explicit, no text ever specifies all the relationships among events, motivation of characters, and nuances of tone and style that every author hopes readers will infer as they read. Instead, authors omit from their texts exactly those relationships and nuances they expect (and hope) readers can figure out for themselves. (p. 726)

Harvey and Goudvis (2000) believe that, "Inferring occurs at the intersection of questioning, connecting, and print" (p. 96). When students learn to read in a way that allows them to connect to these points, they will be more successful at comprehending what they are reading. Because it is necessary for students to infer while reading in order to successfully comprehend the text, teachers must take this into consideration when planning reading instruction. When students are provided proper and direct inference instruction, they become more successful readers. Thus teachers should take the steps to assure that they are including proper inference instruction in their classrooms in order to better serve their students.

Making proper inferences is a task of which all students are capable (McMackin & Witherell, 2005; Dewitz, Carr, & Patberg, 1978), but different inferential skills develop at various times throughout a child's developmental stages. Paris and Lindauer (1976) and Paris, Lindauer, and Cox (1977) noted in their research that inference skills develop between the ages of six and twelve. In a study completed by Pillow and Pearson (2009), it was noted that children begin to develop and classify inferences in kindergarten, and major gains are made in third grade, but students do not have a full

understanding of inferences until fourth grade. When looking at how children infer, it is also important to note that normally the older the child, the more inferences he or she can make (Paris & Lindauer, 1976; Paris, et al., 1977).

Children are expected to make proper inferences when reading any genre. When reading narratives, children often automatically make inferences because the story they are reading mimics everyday life (Graesser, Singer, & Trabasso, 1994). In order for children to have a full understanding of the story when reading children's picture books, students must make connections between the text and pictures as well as make inferences based upon the combination of the two (Richards & Anderson, 2003). Research shows that even first-grade students can make inferences based on printed text. Their ability to infer while reading depends on how removed the text source is from the reader (Allen, 1985). When asked to recall sentences that contained either explicit or implicit cues, second grade students were able to recall many sentences with explicit cues and only a few sentences with implicit cues (Paris, et al., 1977). When students are able to infer information in children's books, they not only comprehend the story, but their enjoyment of the story also increases (Richards & Anderson, 2003).

Children are expected to infer in countless situations in their daily lives, and they are able to successfully do so (Hansen & Pearson, 1983; McGee & Johnson, 2003; Nokes, 2008). If someone had water dripping off their coat when they came in from outside, children would draw on their prior knowledge and infer that it was probably raining outside. Although children are expected to infer in many children's picture books and real life circumstances, they often have a difficult time making inferences in the

classroom setting because they are not given the opportunity to practice and use this skill during instructional time (Hanson & Pearson, 1983; McGee & Johnson, 2003).

Specific inference training can be beneficial to students because it can help improve their reading skills. It is necessary for children to infer when reading and the reason that some striving readers have a difficult time fully comprehending text is because they are unable to make inferences (Nokes, 2008; Richards & Anderson, 2003). When a reader makes inferences as to why events and actions occur in a text, he or she is achieving deeper comprehension than those who read passively and do not construct causes and motives as they read (Graesser, et al., 1994). Readers of all ages struggle with this skill and students who struggle to make proper inferences are more likely to struggle to comprehend the text. An inability to make proper inferences may play a large role in understanding a text for those students who struggle to comprehend what they read (Cromley & Azevendo, 2007). Pardo (2004) states, "Once teachers understand what is involved in comprehending and how the factors of reader, text, and context interact to create meaning, they can more easily teach their students to be effective comprehenders" (p. 272) and since the ability to make inferences is important in the comprehension of text, educators should incorporate inference in their instruction.

Value of Inference Instruction

Many students are unaware of the cognitive processes that they are using when they make inferences. In fact, Nokes (2008) if more teachers devoted instructional time to the use of this process, students might become more aware of the skill and be able to more successfully transfer it into reading. Metacognition is a necessary skill for teachers to promote within students' thinking. Overall comprehension can improve when students

are made aware of when and how they gain information from a text (Pearson & Dole, 1987). Unfortunately, background knowledge and reading ability are not enough to get students through all reading situations. Students need explicit instruction in strategies that make valuable use of their knowledge (Phillips, 1988).

In a 1981 study, Hansen realized that both strategy instruction as well as practice have a direct effect on students' comprehension abilities. Thus, because inferring is so important to the comprehension of texts, it must be emphasized in the classroom (McMackin & Witherell, 2005). Cromley and Azevendo (2007) note the need for teaching inference strategies, "Accurately enacting strategies can enable inferences which can lead to comprehension" (p. 312). Explicit instruction in making inferences can aid students' comprehension, and research suggests that when students are provided with specific inference instruction, they develop a better understanding of texts than students who received typical classroom instruction. Furthermore, the students who receive specific inference training not only improve their inference abilities, they also improve their overall comprehension (Fritschmann, Deshler & Schumaker, 2007; Hansen, 1981; Hansen & Pearson, 1983; McGee & Johnson, 2003; Parker & Hurry, 2007; Yuill & Joscelyne, 1988).

Inference instruction has not been found to hinder other areas of reading comprehension. Research shows that inferential thinking, predicting, and responding to inference questions increase the number of correct answers to both inference as well as literal questions (Hansen, 1981). Children can be taught to implement a specific strategy that can aid inferential thought about a text as well as reading comprehension. When implemented and taught correctly, students can learn to independently apply the strategy

and their knowledge to subsequent material. Teaching students to properly use a strategy promotes greater inference comprehension than preparing students for "to-be-learned" content (Dewitz, et al., 1987). When students are taught to think inferentially, they retain more information because they are actively involved in the thought process. In comparing inference learning and classification, Sakamoto and Love (2010) noted that students who used inference learning were able to acquire and retain more category properties than those learning through classification.

When students fully comprehend the text, they are more likely to find the text entertaining and enjoyable. Students who do not make proper inferences while reading miss out on much of the meaning, causing them to miss the enjoyment associated with the text (McGee & Johnson, 2003; Nokes, 2008). Teaching students to make inferences while reading can promote enjoyment and motivation not only because it can increase comprehension, but also because higher order thinking promotes a more interesting and "lively" discussion (Hansen & Pearson, 1983). Making inferences is associated with ease while reading and performing tasks. The ease with which a student can perform a task can also help to determine enjoyment and motivation. Sakamoto and Love (2010) noted that students who used inference learning had a more enjoyable learning experience. Out of the two learning processes used in the study, inference learning and classification, 10 out of 11 students preferred the content more when they used inference learning as opposed to classification. The researchers believe this is because students had a better understanding of the content and that made the content easier to learn for these students. The easier content is for students, the more enjoyable they will find the topic and the more motivated they will be to learn.

Activating students' prior knowledge is an important step in reading comprehension as well as inference instruction. Many researchers have noted the importance of activating prior knowledge and having proper prior knowledge (Hansen, 1981; Paris, et al., 1977; Pearson, Hansen, & Gordon, 1979). In order for students to comprehend a text, the concept must connect to and represent schema (Hansen, 1981). Prior knowledge not only has a positive effect on overall comprehension, but also facilitates inferential comprehension (Cromley & Azevendo, 2007; Pearson, Hansen, & Gordon, 1979). Background knowledge is necessary for students to make inferences, and when students struggle with making inferences or inferential comprehension, a lack of prior knowledge might be to blame. Younger children do not make as many inferences as older children. This may not be due to their inability to infer, but rather their lack of relevant prior knowledge or their inability to retrieve the correct prior knowledge on their own. Striving readers might not be limited in their ability to infer, but rather in their prior knowledge (Hansen, 1981; Paris, et al., 1977). Proper retrieval and activation of prior knowledge can help students make connections with the text. Since students are expected to draw from their background knowledge to make proper inferences, proper inference instruction can help students make text-to-text, text-to-self, or text-to-world connections (McGee & Johnson, 2003; Narvaez, van den Broek, & Ruiz, 1999). Students who make these connections develop a personal connection to the text which can facilitate comprehension as well as engagement and enjoyment.

Although learning to make connections and inferences through drawing upon prior knowledge might be simple for students, teachers must encourage them to back up their inferences with proof from the text. This may be difficult for readers because

students often overlook the details in the text and move right into making predictions, drawing conclusions, and making inferences. When students read more difficult texts, this becomes an even greater challenge for them to overcome (McMackin & Witherell, 2005). In order for proper inference instruction to take place, teachers must show students how to connect their knowledge and predictions with the text in order for the student to develop an accurate inference (McMackin & Witherell, 2005; Nokes, 2008). Encouraging students to support their inference with textual evidence can be achieved by asking students how they discovered that answer (Richards & Anderson, 2003).

Effective Inferential Comprehension Instruction

Proper reading strategies provide students with numerous opportunities to engage in questioning throughout the text. Readers process text more comprehensively when answering questions; therefore they better recall information that has been explicitly questioned than information that has not (Sundbye, 1987). Although literal and factual questions can be beneficial, comprehension is guided by "why"-questions which help striving readers make inferences (Graesser, et al., 1994). Inferring and questioning work together to increase understanding of a text (Harvey & Goudvis, 2000). Students should be exposed to inference questions; they should be required to predict, relate information to their prior knowledge, and evaluate outcomes in the text (Pearson, 1985). Simply asking students to answer inference questions throughout the story can be as beneficial as explicitly stating the same information within the text and both literal and inferential comprehension can improve when students are required to answer many inference questions throughout the text (Hansen, 1981; Parker & Hurry, 2007; Sundbye, 1987). Hansen (1981) noted students who practiced answering inference questions performed

better on standardized reading tests than students who practiced predicting and those who received no inference instruction.

When encouraging questioning of the text, teachers should not only expect students to answer questions, but produce them as well. There should be a move from teacher questioning to student question generation. Question generation by students is a necessary step in the reading process (McGee & Johnson, 2003; Parker & Hurry, 2007; Pearson, 1985; Raphael, 1982; Sundbye, 1987). As students have more practice generating questions, they will find it to be easier and will move from simple questions to more complex questions and answers (McGee & Johnson, 2003). When students learn to generate their own questions, they are moving toward true ownership of their reading as well as the strategy they are employing. This can greatly benefit their future reading as they learn to apply the strategy to all reading situations (Raphael, 1982). Students learning to generate inference questions show greater reading improvement than students who receive instruction in other comprehension strategies (McGee & Johnson, 2003).

Readers should practice generating questions based around the text and incorporate "who," "what," "why," "when," and "how" questions (McGee & Johnson, 2003; Richards & Anderson, 2003). Unfortunately, many teachers are not asking students to properly question the text. Of the classrooms observed in Parker and Hurry's study (2007), only about 5% of text questions were generated by the students. By generating the majority of the questions, teachers are not providing students the chance to think metacogniatively throughout the reading process. Teachers can help students learn to generate questions by proper modeling and allowing ample time for practice.

Because readers must actively seek meaning and actively construct meaning, they should take an active role in the reading and learning process. There are a great number of reading strategies related to this process, however scaffolding is an overarching idea within most reading instruction plans. Pearson and Gallagher (1983) produced a model for gradual release of responsibility whereby teachers begin by modeling the strategy and students end by applying the strategy to other readings. Proper modeling is an extremely important step in reading instruction.

Another important, and often overlooked, step of modeling is that teachers should address the cognitive process of making inferences and why it is important in reading before they explain the specific comprehension strategy, discuss its importance, and describe when to use it. Once teachers have done this, they can begin teaching students how to implement the strategy (Hansen & Pearson, 1983; McMackin & Witherell, 2005; Richards & Anderson, 2003). Hansen (1981) suggests that students might benefit from a clear explanation of the inferential process and its benefits instead of simply modeling the process. Although the goal is for students to take responsibility, this does not mean that teachers should give them total responsibility immediately. Teachers should begin reading instruction by modeling and assuming full responsibility while sharing strategies, secrets, successes, and failures. Explaining the strategy, thinking aloud, and showing when and why the strategy works are all important steps in the modeling stage of reading instruction (Pearson & Gallagher, 1983; Pearson, 1985). Within a lesson, however, guided practice is where true instruction takes place. Working together, teachers and students decipher how the strategy works. Following the teacher's modeling, students practice the strategy in a whole group, small group, and with partners while they receive

feedback about what they are doing correctly and what they can improve (Pearson & Dole, 1987; Pearson & Gallagher, 1983). When students have a solid understanding of the strategy, they should move onto independent practice. At this stage, students apply the strategy on their own to a reading task. Students should reveal their thought process because receiving feedback is imperative in this step in order for students to move on to application (Pearson & Dole, 1987; Pearson & Gallagher, 1983).

Application is the final step of the process. Students take full responsibility and, therefore, can take true ownership of their reading. Once students reach this step they should be encouraged to use the strategy for other readings. When students reach this stage they are able to apply the strategy to other texts and areas of learning as they think metacognitively about their reading and the process (Pearson & Dole, 1987; Pearson & Gallagher, 1983; Raphael, 1982).

Many teachers are not currently using proper techniques to promote inference and comprehension skills. Good inference instruction should include an explanation of the intentions behind the instruction, teacher modeling, teacher and student questioning, independent practice, connections to background knowledge, and inferences based around the text. Teachers should explain that making inferences is looking at the pictures and/or text and making connections to figure out exactly what the author is trying to say (McMackin & Witherell, 2005; Richards & Anderson, 2003). Students should, "use the information in the text, blend it with their own experiences and knowledge, and then read between the lines to figure out what the author" is meaning (McMackin & Witherell, 2005, p. 246). By beginning instruction with modeling appropriate questioning

throughout the text and thinking aloud as they read, teachers are setting students up for success (Nokes, 2008; Pardo, 2004; Parker & Hurry, 2007; Richards & Anderson, 2003).

Teachers should scaffold instruction by gradually moving from modeling to independent practice and application, eventually transferring responsibility to the students (McGee & Johnson, 2003; Nokes, 2008; Pardo, 2004). Once they understand the process, students should then be able to generate their own questions while reading the text. When students make inferences in reading, they connect their prior knowledge to the text. Teachers must encourage students to draw on their prior knowledge when incorporating proper inference instruction. By sharing their prior knowledge with the class, students are able to build their schema and develop a larger knowledge bank to draw from in the future. When students are prompted to activate their prior knowledge during the reading process, they learn to do so on their own, and when readers have a larger knowledge base related to the content in the text, they are more likely to make good inferences (Hansen & Pearson, 1983; McGee & Johnson, 2003; McMackin & Witherell, 2005; Nokes, 2008). Research shows that direct inference instruction can be helpful to students, but it must be implemented in the correct way. By following the proper steps, teachers can better support their students in the reading process.

When proper inference training is implemented, students become more successful at comprehending the text they are reading. Direct inference instruction can be beneficial to all students, but research shows that it may help striving readers more than skilled readers. Researchers are not sure why this is the case, but they suggest one possible reason is that poor readers receive more instruction on decoding skills instead of comprehension (Hansen & Pearson, 1983). Because of this, striving readers have more

room for improvement in comprehension, and when they receive any direct instruction in comprehension or inferring, they are likely to make great improvement. Skilled readers receive more comprehension instruction in the classroom, so they likely have less room for comprehension improvement (McGee & Johnson, 2003). Skilled readers might also show less improvement because they already know the strategies being taught during direct inference instruction. For example, skilled readers often already know how to question the text in order to develop a deeper comprehension of what they are reading (Parker & Hurry, 2007).

Hansen and Pearson (1983) also hypothesize that the reading materials might be the reason skilled readers did not show as much improvement as much as striving readers. Skilled readers often read texts at levels lower than their instructional level. It is possible that if the students were using more challenging texts that were within their instructional level, the research may have shown greater improvement in good readers. Although striving readers have shown greater improvement in most research conducted, skilled readers cannot be forgotten; skilled readers also made improvement when provided with direct inference instruction. Because all students can improve their reading and comprehension skills with explicit inference training, all students should be given the opportunity to learn to use this skill.

When students are provided proper and direct inference instruction, they become more successful readers. They begin to better comprehend text, and can become more engaged during the reading process. McGee and Johnson (2003) believe

> Exposure to inference training can prove effective in increasing children's engagement with and processing of text. Such skills are then more likely to be

transferred to other text-based tasks within the school setting and may enhance children's perspective of reading as a worthwhile extracurricular activity. (p. 59)

Research shows that students can not only make correct inferences when reading, but can also increase comprehension through these inferences. In order to meet the needs of all students, teachers must take the proper steps to implement inference instruction in their respective classrooms.

Chapter Three

Methodology

Overall Design

This study examined the effects of direct inference instruction on reading comprehension as well as students' interest and motivation in reading. The study was conducted at an elementary school in Central Illinois. Using two fourth grade classrooms, the study included one control group and one experimental group. Implementation of the strategy and lessons associated with this research project took place during the regular reading instruction period provided for each classroom. The control group was taught from the same texts as the experimental group, but the control group did not receive the inference strategy instruction that was implemented in the experimental group. Beginning with teacher modeling and gradually moving to student independent practice and application, the inference strategy taught students to question the text, find answers in the text or from their prior knowledge, and read between the lines to make inferences. Using a graphic organizer, students read the inference question, reviewed the text looking for the answer, drew from their own prior knowledge to make an inference, and finally developed an answer for the question. Following teacher modeling, students practiced the strategy in a whole group setting with the aid of the teacher. The strategy was scaffolded so that all students practiced the strategy under direct supervision of the teacher as a whole group, in small groups, and finally independently. Lessons were implemented twice a week for a total of ten sessions. Each session lasted between 20 - 50 minutes, depending on the length of the test and the amount of discussion and questions generated. Students were assessed using the Informal

Reading Inventory (IRI) by Roe and Burns (2007) and the Elementary Reading Attitude Survey (McKenna & Kear, 1990) once prior to implementation of the strategy and once following completion of the strategy implementation. Students' scores on the Measures of Academic Progress (MAP), an assessment used at the participating school, were examined in the fall and in the winter as a means of determining students' comprehension skills.

Participants

The participants in this study (n=33) were fourth grade students enrolled in an elementary school in Central Illinois. The school consisted of a total of 314 students and 56 fourth grade students. Nearly 17% of students in the school were receiving services through an Individualized Education Plan. Students receiving free and reduced lunches made up 30.9% of the school population. Following a meeting with the principal and teachers in the school, two fourth grade classroom teachers agreed to participate in the study; one experimental group (n=18) implemented the inference strategy instruction and one control group (n=15) implemented alternative comprehension practice. The strategy or comprehension practice was implemented with all students in the participating classrooms who agreed to participate. All participants' scores on the Measure of Academic Progress (MAP) and results of the Elementary Reading Attitude Survey were analyzed in this study. Students assessed using the Informal Reading Inventory were chosen at random based on their reading level as determined by the Illinois Standards Achievement Test (ISAT). Six students from both the experimental and control group completed an alternative comprehension assessment; from each group two students reading above grade level, two students reading at grade level, and two students reading

below grade level according to their ISAT scores were asked to complete at least two listening comprehension passages from the Informal Reading Inventory.

Instruments

Measures of Academic Progress. The Measures of Academic Progress (MAP) was chosen by the school district to be used as a screening assessment for all students. Testing students three times a year, the MAP instrument was developed to measure students' educational achievement, monitor progress, and to assist educators in targeting students' instructional needs. Students answered questions based on different aspects of reading (i.e., word analysis and vocabulary, comprehension, literature, and literacy works). As a student answers questions correctly, he or she is given more difficult questions, and if a student answers questions incorrectly, he or she is given easier questions. This sliding scale was used to determine each student's score. In addition, the MAP determines each student's score range, a district average, a norm group average, and each student's percentile range. In 2011, the norm was based on a sample of at least 20,000 students per grade level drawn randomly from 5.1 million (Northwest Evaluation Association, 2011b). All students in the district completed the MAP assessment and the researcher obtained all participating students' scores.

Informal Reading Inventory. The Informal Reading Inventory (IRI) by Burns and Roe (2007) was designed to identify a student's independent, instructional, and frustration levels in word recognition, oral reading comprehension, silent reading comprehension, and potential level in regard to listening comprehension. Because the purpose of this study was to look at reading comprehension, the researcher did not identify students' independent, instructional, and frustration levels in word recognition,

oral reading comprehension, or silent reading comprehension. Instead, the researcher read aloud leveled reading passage. The passage levels were chosen for each student based on students' (ISAT) scores. Each level consisted of four reading passages (two before implementation of the strategy and two after implementation of the strategy) and each reading passage was followed by 10 comprehension questions (Appendix A). The IRI identified specific areas of comprehension (i.e., Main idea, Vocabulary, Inference, etc.) that were addressed by each of the 10 questions. This instrument was implemented by the researcher in order to gain greater insight into each student's ability to answer the various types of comprehension questions.

Elementary Reading Attitude Survey. The purpose of the Elementary Reading Attitude Survey by McKenna and Kear (1990) was to assess the students' attitudes towards recreational and academic reading. There were 20 questions on this assessment. The students read the questions and then chose one of the four Garfield pictures to represent their answer. There were four different Garfield pictures depicted: happy Garfield was equal to four points, slightly smiling Garfield was equal to three points, mildly upset Garfield was equal to two points, and very upset Garfield was equal to one point. The Elementary Reading Attitude Survey was administered to 18,138 first- through sixth-grade students in 1989 in order to provide normative data (McKenna & Kear, 1990). In this study all participating students' scores were compared with the national sample to determine percentile ranks.

Anecdotal Notes. The researcher took anecdotal notes throughout the study. Observing the classroom teacher as he taught the strategy, the researcher noted the students' reactions to the strategy. Observing the class as a whole, the researcher

recorded the general feeling within the classroom. The research also noted each time an inference was made aloud, each question that was asked, and each answer provided by both students and the teacher. The researcher also assessed the students' level of engagement. Students looking at the teacher, answering questions, writing on the graphic organizer, or engaging in conversation related to the topic were considered to be signs of engagement, while students looking around the room, talking off topic, drawing pictures not related to the subject, and looking otherwise distracted were recorded as reflecting a lack of engagement.

Procedure

Participants. Students from two fourth grade classrooms in an elementary school in Central Illinois participated in this study. One fourth grade classroom served as the experimental group and one classroom served as the control group. Upon district approval, parents/guardians of students in participating classrooms were sent a letter outlining the study and explaining the informed consent process (Appendix C). Parents/guardians were asked to respond to the letter if they were unwilling for their child to participate in the study (Appendix D). Students in the two classes participating in the study received information outlining the research study and were asked to agree or reject participation in the study (Appendix E). All parents agreed to allow their child to participate in the study; however, four students in the control group rejected participation in the study. All participating students in the experimental group (n=18) received instruction on an inference strategy and all participating students in the control group (n=15) received instruction in alternative comprehension practice. In the experimental group as well as the control group, all participating students' (n=33) scores on the

Measure of Academic Progress (MAP) and results of the Elementary Reading Attitude Survey (Appendix B) were analyzed. Six students from the experimental group and six students from the control group were tested using an Informal Reading Inventory (IRI) (Appendix A). Students assessed using the IRI were chosen at random based on their reading level as determined by the Illinois Standards Achievement Test (ISAT).

Experimental Group Instruction. A total of 10 lessons were implemented during this research study. Each lesson lasted between 20 and 50 minutes. The study took place over six weeks usually with two sessions each week. Instruction took place in the classroom as whole-group, small-group, and independent activities. Beginning with teacher modeling and gradually moving to student independent practice and application, the inference strategy aided students in the questioning of the text, finding answers in the text or from their prior knowledge, and reading between the lines to make inferences. Using a graphic organizer (Appendix G), students read questions or asked their own questions, reviewed the text looking for the answer, drew from their prior knowledge to make an inference, and finally developed an answer.

The researcher provided 10 lessons for the experimental group teacher to use while teaching the strategy. The strategy began with a discussion of what inferences are, why good readers make inferences, and how to make inferences. Using a real life example, the teacher modeled how to make an inference and then asked students to make inferences based on real life examples. Once students understood how to infer, the teacher began explicitly teaching a strategy for making inferences.

While conducting a read-aloud of a trade book, the teacher thought aloud while making inferences to model for the students what good readers do while reading. The

teacher would stop periodically to model questioning the text while thinking aloud. After the text was completed, the teacher asked prepared questions aloud and used the graphic organizer to answer the questions. The teacher read each question aloud and then found where the answer was supported in the text or illustrations. The teacher wrote what the author told the reader and then made a connection with the text. Using what the author said and connecting it with prior knowledge, the teacher developed an answer for each question. As students began to understand the process of making inferences and using the graphic organizer, the teacher gradually released responsibility to the students. The books were read-aloud by the teacher and were also visually represented by projecting the book on the board.

Instruction was scaffolded to aid students in the implementation of the strategy. Once students began to develop an understanding of inferring while reading, students were encouraged to share their thoughts or questions while the teacher read each text. Continuing to give students more responsibility, the teacher provided students with the questions at the end of the text, but asked the class as a whole to develop answers using the graphic organizer. Providing students with more modeling and feedback as they performed the task, the teacher helped students better understand the strategy. Toward the end of the study, as students showed an even greater understanding of inferential thought and the strategy, they were encouraged to work in small groups or independently. The teacher provided students with a reading passage, selected based on the grade level, with which they could practice the strategy. Students were encouraged to ask their own questions both while reading as well as after reading.

Control Group Instruction. A total of 10 lessons were implemented during this research study. Each lesson lasted between 20 and 45 minutes. The study took place over six weeks usually with two sessions each week. Instruction took place in the classroom as whole-group, small-group, and independent activities. Using the same trade books as the experimental group, the teacher of the control group read the text aloud on PowerPoint and asked students to answer literal questions following the reading of each text. The teacher also implemented alternative reading comprehension strategies during and following the reading of each text. Each book focused on a different comprehension strategy. Students summarized, visualized, synthesized information, and made connections during and following the reading of the trade books. As the experimental group moved to small group and independent practice, the control group also worked in small groups and independently.

Data Collection. Prior to implementation of the strategy, the researcher assessed six students in the experimental group and six students in the control group using the Informal Reading Inventory (IRI). Students assessed using the IRI were chosen at random based on their reading level as determined by their scores on the Illinois Standards Achievement Test (ISAT). Students reading above grade level as determined by ISAT were assessed on two grade-four reading passages, and two grade-five passages. Students reading at grade level according to their ISAT scores were assessed on two grade-four reading passages. Students reading below level as determined by their ISAT scores were assessed on two grade-four passages, and two grade-three passages. Each student was assessed independently by the researcher. The researcher read the passage aloud to the students and asked a series of questions provided by the IRI. The students'

answers were recorded in writing. Following the same steps as in the pretest, the researcher assessed the same students using the IRI after implementation of the strategy, but employed different passages to avoid a practice effect.

All participating students were assessed using the Elementary Reading Attitude Survey prior to implementation of the strategy. Students were asked to circle the picture that best described how they felt about different reading situations. This was done in a group setting. Following six weeks of implementation of the strategy, the researcher assessed students again using the same Elementary Reading Attitude Survey.

Both the IRI and the Elementary Reading Attitude Survey results were obtained specifically for the purpose of this research study. The researcher also obtained all participating students' records from the Measure of Academic Progress (MAP). This assessment is given to students by the school three times a year to evaluate students' progress throughout the year. The researcher obtained results from the MAP assessment prior to implementation of the strategy and following implementation of the strategy. The researcher also obtained all participating students' ISAT scores in order to determine students' reading levels prior to implementation of the strategy.

Data Analysis

Data was analyzed using the Statistical Package for the Social Sciences (SPSS). This program was used to obtain descriptive statistics and compare pre-and post-test data from the Elementary Reading Attitude Survey and the Measures of Academic Progress. Data for the Informal Reading Inventory was recorded and analyzed using Excel.

Chapter Four

Results

The results of this study are recorded in this chapter. The chapter is divided into four sections that provide a quantitative and qualitative analysis of the data for each research hypothesis.

Impact of Inference Instruction on Overall Comprehension

Research Hypothesis (1): Students will show improvement in their overall reading comprehension abilities after receiving explicit inference instruction.

Quantitative analysis. A paired samples t-test was used to compare the pre- and post-test score means of the participants in the experimental group and control group using the Measures of Academic Progress (MAP) (Table 1). The test yielded a score of $t = 2.585$ ($df = 17$), $p = .019$ for the experimental group. The test yielded a score of $t = 3.381$ ($df = 14$), $p = .004$ for the control group. Although the results for the experimental group were found to be significant, the results of the control group were also found to be significant.

Table 1
Paired Samples Test
Comparison of Pre- and Post-test Data from the MAP

	Mean	Std. Deviation	Std. Error Mean	t	df	Sig. (2-tailed)
Experimental Group	4.444	7.294	1.719	2.585	17	.019
Control Group	6.733	7.713	1.992	3.381	14	.004

A one way ANOVA was used to compare the control and experimental groups (Table 2) in regard to the amount of growth in reading that was evident over the duration of the intervention (i.e., the difference in pre- and post-test MAP scores for the two

groups). The test yielded a score of F = .418 (df = 1), p = .523. Because the results were not statistically significant, Research Hypothesis 1 was not supported by the data.

Table 2
One Way ANOVA
Comparison of Pre- and Post-test Data from the MAP between the Control Group and the Experimental Group

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	24.582	1	24.582	.418	.523
Within Groups	1822.933	31	58.804		
Total	1847.515	32			

Participating students' scores for the Informal Reading Inventory were recorded and their total scores were converted into percentages (Table 3). For students in the experimental group, the average score on the pre-test was 41% and the average score on the post-test was 61%. Most participating students in the experimental group showed gains between the pre- and post-test while just one student showed neither a gain nor a loss. Student seven's score stayed the same at 12% for both the pre- and post-test. In contrast, the average score for the control group on the pre-test was 50% and the average score on the post-test was 58%. Three students showed an increase between the pre- and post-test and three students showed a decrease in the control group. Since most students in the experimental group showed an increase in their overall reading comprehension scores according to the IRI, Research Hypothesis (1) was supported by the data.

Table 3
Percentages of Students' Overall Scores on the IRI

Experimental Group			Control Group		
Student	Pre-Test	Post-Test	Student	Pre-Test	Post-Test
2	70%	85%	25	48%	35%
4	60%	85%	28	55%	75%
5	10%	48%	29	53%	55%
6	55%	65%	30	50%	70%
7	12%	12%	31	70%	60%
8	38%	70%	32	25%	55%

Qualitative analysis. Anecdotal notes were used to assess subjects' comprehension in the experimental group. The researcher noted that students were able to comprehend the texts throughout the process. Students who volunteered answers and generated questions at the beginning of the project demonstrated an understanding of the text. Toward the end of the project, students showed comprehension of the text through independent and group work; this allowed the researcher to evaluate each individual student's level of ability. Fourteen of the 18 participants showed strong overall comprehension at the end of the project.

Impact of Inference Instruction on Multiple Categories of Comprehension

Research Hypothesis (2): Students' reading will improve in multiple areas of comprehension including making inferences, noting details, and generating the main idea.

Quantitative analysis.

Participating students' scores for the Informal Reading Inventory (IRI) were recorded according to the category of comprehension question as coded by the authors of the IRI (Table 4). Students' scores within each category were analyzed and determined to have either increased, decreased, or stayed the same from the pre-test to the post-test. For the purpose of this study, the scores were analyzed by looking at the total number

correct in comparison against the total number of possible questions and each score was then converted to a percentage. For example, a student who answered two questions correctly when there was a total of five possible questions (2/5) in the pre-test and answered two questions correctly when there was a total of three possible questions (2/3) in the post-test was believed to have increased in that comprehension category. This is because the student would have moved from answering 40% of the questions correctly to answering 67% of the questions correctly. Since the total number of possible questions varied, percentages are not necessarily an accurate portrayal of each student's performance; however, the researcher chose to convert all scores into percentages to aid in the analysis of the students' scores.

For students in the experimental group, most comprehension categories showed an increase with the exception of cause and effect – details, which showed a decrease. For main idea, four students showed an increase while two students stayed the same. Four students showed an increase in details while two students showed a decrease. All students showed an increase in vocabulary comprehension. For cause and effect – inference, five students showed an increase, and one student stayed the same. Four students showed an increase in inferences while two students showed a decrease. In the category of sequencing, four students showed an increase while two students showed a decrease. Two students showed a decrease while two students stayed the same in the category of cause and effect – details. Because there is a varying number of questions within each category and because the sample size is so limited, Research Hypothesis 2 cannot be determined with confidence to be either supported or not supported by the data.

Table 4

Students' IRI Scores According to Each Category of Comprehension Question

	Student 5 Below Grade Level	Student 7 Below Grade Level	Student 4 At Grade Level	Student 6 At Grade Level	Student 8 Above Grade Level	Student 2 Above Grade Level
Main Idea Pre-Test	0/4 (0%)	0/4 (0%)	2/2 (100%)	1/2 (50%)	2/4 (50%)	4/4 (100%)
Main Idea Post-Test	3/4 (75%)	1/4 (25%)	2/2 (100%)	2/2 (100%)	4/4 (100%)	4/4 (100%)
	Increase	Increase	Same	Increase	Increase	Same
Detail Pre-Test	1/10 (10%)	1/10 (10%)	1/6 (17%)	4/6 (67%)	4/11 (36%)	7/11 (64%)
Detail Post-Test	3/10 (30%)	0/10 (0%)	4/5 (80%)	3/5 (60%)	5/10 (50%)	8/10 (80%)
	Increase	Decrease	Increase	Decrease	Increase	Increase
Vocabulary Pre-Test	1/6 (17%)	2/6 (33%)	3/4 (75%)	1/4 (25%)	3/9 (33%)	6/9 (67%)
Vocabulary Post-Test	5/6 (83%)	3/6 (50%)	4/4 (100%)	4/4 (100%)	5/8 (63%)	8/8 (100%)
	Increase	Increase	Increase	Increase	Increase	Increase
Cause/Effect Inference Pre-Test	0/3 (0%)	0/3 (0%)	1/2 (50%)	1/2 (50%)	2/5 (40%)	4/5 (80%)
Cause/Effect Inference Post-Test	2/4 (50%)	0/4 (0%)	2/2 (100%)	2/2 (100%)	2/3 (67%)	3/3 (100%)
	Increase	Same	Increase	Increase	Increase	Increase
Inference Pre-Test	3/11 (27%)	2/11 (18%)	4/4 (100%)	2/4 (50%)	3/7 (43%)	4/7 (57%)
Inference Post-Test	4/9 (44%)	0/9 (0%)	2/3 (67%)	2/3 (67%)	4/6 (67%)	6/6 (100%)
	Increase	Decrease	Decrease	Increase	Increase	Increase
Sequence Pre-Test	0/3 (0%)	0/4 (0%)	1/2 (50%)	2/2 (100%)	0/3 (0%)	2/3 (67%)
Sequence Post-Test	2/6 (33%)	1/6 (17%)	3/4 (75%)	2/4 (50%)	2/7 (29%)	3/7 (43%)
	Increase	Increase	Increase	Decrease	Increase	Decrease
Cause/Effect-Detail Pre-Test	2/2 (100%)	0/2 (0%)	*	*	1/1 (100%)	1/1 (100%)
Cause/Effect - Detail Post-Test	2/2 (100%)	0/1 (0%)	*	*	1/2 (50%)	1/2 (50%)
	Same	Same	N/A	N/A	Decrease	Decrease

*There were no cause and effect – detail questions in the fourth grade passages

Qualitative analysis. Anecdotal notes were used to assess subjects' comprehension in the experimental group. Most students in the experimental group began the study with little or no knowledge of inferences. During the first opportunity that was provided for students to answer inference questions, only two students volunteered answers. As the study progressed, more and more students volunteered answers to inference questions, and upon completion of the study, all but four students were able to answer inference questions following the reading of a text in class. The study focused mainly on making inferences, so most questions asked throughout the lessons were inference questions. Because of this limitation, the researcher did not obtain additional anecdotal data to support Research Hypothesis 2.

Impact of Inference Instruction on Students' Inferential Awareness

Research Hypothesis (3): Students who do not show awareness of inferential thought before implementation of explicit inference instruction will show greater improvement following the strategy than those who show awareness of inferential thought before implementation of the strategy.

Quantitative analysis. Participating students' inferential thought scores were obtained using the IRI. Students' inference scores were analyzed by examining the total number correct in comparison to the total number of possible questions and these scores were converted into percentages; however, because the number of total possible questions varied and there were so few questions, these percentages are not necessarily an accurate portrayal of the students' performance.

For the purpose of this study, students who answered 80% or more of the inference questions correctly were believed to have inferential thought. Before

implementation of the inference strategy, only one student showed awareness of inferential thought according to the standards set for this study. Student four answered all inference questions correctly in the pre-test. All other students scored below the standard set for this study. Students' pre-test scores ranged from 4/7 questions answered correctly (57% of questions answered correctly) to 2/11 questions answered correctly (18% of inference questions answered correctly) (Table 5). Student two answered all inference questions correctly on the post-test, so that was the only student who met the criterion on the post-test. The student who showed awareness of inferential thought in the pre-test showed a decline in inferential awareness (2/3 questions answered correctly in the post-test or 67%) while all but one student who did not show an awareness of inferential thought before implementation of the strategy showed an increase in inferential thought following implementation of explicit inference instruction. Students two, five, six, and eight showed an increase in inferential thought in the post-test while students four and seven showed a decrease. Four of the five students who did not show evidence of inferential thought before implementation of direct inference instruction showed an increase in inferential awareness following the strategy. Although most students showed an increase in inferential thought, it cannot be stated with certainty that the data supports Research Hypothesis 3 due to the small sample size and the varying number of questions.

Table 5
Students' IRI Scores for Inference Questions

Student	Inference Pre-Test	Inference Post-Test
2	4/7 (57%)	6/6 (100%)
4	4/4 (100%)	2/3 (67%)
5	3/11 (27%)	4/9 (44%)
6	2/4 (50%)	2/3 (67%)
7	2/11 (18%)	0/9 (0%)
8	3/7 (43%)	4/6 (67%)

Qualitative analysis. Anecdotal notes were used to assess the experimental groups inferential awareness throughout the study. Most students in the experimental group began the study with little to no knowledge of inferences. The first opportunity for students to answer inference questions, only two students volunteered answers. As the study progressed, more and more students volunteered answers to inference questions, and upon completion of the study, all but four students were able to answer inference questions following the reading of a text in class. Because the researcher noted an increase in the number of students who showed inferential awareness following implementation of direct inference instruction in the anecdotal notes, Research Hypothesis 3 is supported by the anecdotal data.

Impact of Inference Instruction on Student Motivation

Research Hypothesis (4): Students' interest and motivation will increase following implementation of inference instruction.

Quantitative analysis. A paired samples t-test was used to compare the pre- and post-test score means of the participants in the experimental group using the Elementary Reading Attitude Survey (Table 6). For the experimental group, the test yielded a score of $t = .053$ ($df = 14$), $p = .959$. For the control group, the test yielded a score of $t = 9.04$

(df = 14), p = .382. Since the results were not found to be significant, Research Hypothesis 4 was not supported by the data.

Table 6
Paired Samples Test
Comparison of Pre- and Post-Assessment of the Elementary Reading Attitude Survey

	Mean	Std. Deviation	Std. Error Mean	t	df	Sig. (2-tailed)
Experimental Group	.200	14.649	3.782	.053	14	.959
Control Group	6.467	27.720	7.157	9.04	14	.382

Qualitative analysis. Anecdotal notes were used to assess subjects' interest and motivation in the experimental group. The researcher noted neither an increase nor a decrease in motivation and interest following implementation of the inference instruction; however, there was a difference in motivation depending on the type of materials used. When reading high interest books displayed on the SmartBoard, students showed greater motivation than when they read traditional printed reading passages.

Chapter Five

Discussion

In this chapter a discussion of the results is provided. In addition, recommendations for further research and practice are made.

Discussion of Results

The purpose of this study was to determine if explicit inference instruction in the area of reading improved students' comprehension as well as motivation in reading. The research hypotheses were tested using an Informal Reading Inventory (IRI), students' Measures of Academic Progress (MAP) scores, and the Elementary Reading Attitude Survey. The results are addressed in this section of the discussion.

In support of Research Hypotheses 1 and 2, the results of this study showed an increase in students' comprehension following implementation of direct inference instruction. Research Hypothesis 1 was supported by the IRI data, showing an increase in overall reading comprehension. Students in the experimental group who participated in the Informal Reading Inventory (IRI) showed an average gain of 20% from the pre-test to the post-test while the control group showed an average gain of 8% (Table 3).

It cannot be stated with certainty that Research Hypothesis 2 was supported by the data of this research; participating students' Informal Reading Inventory (IRI) scores showed an increase in all comprehension categories with the exception of Cause and Effect – Details (Table 4), however this data could have been analyzed in multiple ways. By converting the data into percentages, students' scores were able to be compared, yet percentages are not an accurate illustration of students' success. There were varying numbers of total possible questions for each of the categories, and the number of

questions even varied from the pre-test to the post-test. There were also so few questions within each category. For example, some categories only contained two questions. If a student missed one of the two questions, they scored only 50%. The percentages can be misleading in a situation such as this.

The results of supported the findings of many other research studies. Hansen (1981) found that both the instruction and the practice of an inference strategy positively affect students' comprehension, both literal and inferential. Following direct inference instruction, research shows that students' inferential thought increases as well as students' overall reading comprehension (Fritschmann, Deshler, & Schumaker, 2007; Parker & Hurry, 2007).

Research Hypothesis 1 were not supported or rejected by students' scores on the Measures of Academic Progress (MAP). The experimental group showed an increase in their MAP scores (4.44); however the control group showed an even greater increase (6.73) (Table 1). The average of the control groups' pre-test scores was 197.53 while the experimental groups' pre-test score average was 202.67. The post-test average of the control group was 204.27 while the score for the experimental group was 207.11. The greater increase in the control group could be attributed to the fact that the control groups' pre-test scores were significantly less than that of the experimental group, leaving the control group with a greater need and range for improvement.

Although the MAP provided additional data for all participating students in the area of reading, reading comprehension was not independently measured. There are four subareas within the fourth-grade reading assessment for the MAP (word analysis and vocabulary, comprehension, literature, and literacy works) that are all scored together;

each student's scores on the MAP reflect their total reading score. The MAP did not explicitly assess students' inference abilities as it did not contain a sub-category for this topic. The MAP did not measure what the research project was trying to measure; instead the MAP contained categories that did not pertain to the study. Because of these additional categories, students' scores on the MAP are not an accurate assessment of their comprehension or inference abilities. Because this research study looked at the effects of direct inference instruction on reading comprehension, this assessment did not explicitly meet the needs of the study as it did not provide detailed information on students' comprehension abilities nor their inference skills.

Although the results from the IRI showed an increase in overall comprehension as well as comprehension in multiple categories, the assessment had multiple limitations. All students within the same reading level according to their ISAT scores were read the same passages and were asked the same questions; however, the researcher found that the questions often did not only measure solely what they were claiming to measure. For instance, vocabulary questions could also be considered to be inference items as readers who do not know the meaning of a word must read the word in context and make an inference or draw a conclusion as to the definition of the word. For the purposes of this study, the researcher used the comprehension categories recommended in the IRI. Comprehension of the text depended greatly on prior knowledge of the topic; students able to make connections with the text or who had prior knowledge of the concepts discussed within the text scored higher than students without prior knowledge or those who were unable to make connections.

The results from this study do not support or reject Research Hypothesis 3, because of the small sample size and varying number of questions. It is not known with certainty whether or not students who did not show awareness of inferential thought before implementation of explicit inference instruction showed greater improvement following the strategy than those who showed awareness of inferential thought before implementation of the strategy. The one student who showed inferential awareness in the pre-test showed a decrease in the post-test, and four of the five students who did not show inferential awareness in the pre-test showed an increase in the post-test. Hansen and Pearson (1983) noted that struggling readers did not show inferential awareness before direct inference instruction. In their study, struggling readers were unable to answer inference questions before explicit inference instruction, but following direct inference instruction, struggling readers showed an increase in inferential thought through their ability to answer inference questions. Contrary to Hansen and Pearson's study (1983), struggling readers were not the only students who were unable to correctly answer inference questions before implementation of explicit inference instruction in the current research study. Students reading at, above, and below grade level according to their ISAT scores all showed a lack of awareness of inferential thought in the pre-test. Also, in contradiction to Hansen and Pearson's 1983 study, one of the two readers reading below grade level (student seven) answered fewer inference questions in the post-test than in the pre-test.

The difference between the results of the current research project and previous research could be because of the assessment used. As noted earlier, the comprehension categories did not always measure what they were claiming to measure. In addition, each

reading passage contained 10 total comprehension questions, but each comprehension category was represented by different numbers of questions. For example, the third grade reading passage in form B contained one main idea, one sequence, three inference, one cause and effect – detail, one cause and effect – inference, and two detail questions while the fourth grade reading passage from the same form contained one main idea, one vocabulary, three detail, two inference, two sequence, and one cause and effect – inference question. Because of the differences in the number of question types and the small number of questions in each category, it was not possible to compare student performance.

The data did not support Research Hypothesis 4, but there is existing research that supports the increase of student motivation following direct inference instruction (Nokes, 2008; Sakamoto & Love, 2010). A possible reason to account for the lack of significance is also related to Research Hypothesis 3; students who do not show awareness of inferential thought before implementation of explicit inference instruction will show greater improvement following the strategy than those who showed awareness of inferential thought before implementation of the strategy. Hansen and Pearson (1983) found that when struggling readers learned to make inferences while reading, making inferences aided their ability to participate in active discussion as well as implement higher order thinking skills. If striving readers learn to infer while reading, they would also gain ease while reading. Because there was a lack of great increase in struggling readers' inference ability from pre-test to the post-test, these students would have not gained ease while reading. Because of this, students who struggled to make inference

while reading both before and after implementation of the strategy would have, likely, not showed an increase in motivation.

Although the results were not significant, there was still a slight increase (.200) in participants in the experimental group's interest and motivation following implementation of inference instruction. Students in the control group showed yet an even greater increase (6.467) in the post-test (Table 6). This may be attributed to the difference in participating students in the control group and participating students in the experimental group. All students in the experimental group's classroom agreed to participate while four students in the control group opted to not participate in the study. The students of both the control and the experimental group were excited to complete the Elementary Reading Attitude Survey; however, it is not clear if the students answered the questions honestly. Some students chose all of the same Garfield drawings throughout the assessment while others developed a pattern with the Garfield drawings.

Because this assessment included national norms and percentile ranks, the researcher chose to implement this assessment within the study. Although the students' scores can be compared to and ranked against other students' scores across the United States, the researcher noticed nearly all students participating in the research study ranked much higher than the national average. The Elementary Reading Attitude Survey was developed and the norms were established over 20 years ago; because of the drastic changes in society from the initial implementation of this survey to the time of this research study, it must be questioned whether the norms from the survey are still truly applicable today. A final limitation of this assessment must be noted; because students

took the exact same assessment twice, the accuracy of the instrument in measuring change over time may be called into question.

Using anecdotal notes, the researcher noted neither an increase nor a decrease in motivation and interest following implementation of the direct inference instruction; however, there was a difference in motivation depending on the type of materials used. The subjects were engaged and participated when picture books were incorporated into the lessons, and engagement declined when reading traditional passages were incorporated into the lessons. When picture books were used in a lesson, students answered questions, generated questions, made connections, made inferences, and looked at the SmartBoard. When reading passages were used in a lesson, an average of only four students answered questions, students did not generate questions, they did not make connections, no students made inferences, and most students looked around the room and drew on their papers. The interest level of the materials seems to affect student motivation more than the strategy used.

Conclusions

The results of this study do not fully support the use of direct inference instruction in fourth grade general education classrooms. Although students' overall comprehension, performance within multiple categories of comprehension, and inference abilities showed an increase following implementation of the explicit inference instruction, due to limitations it cannot be stated with certainty that each hypothesis was supported by the data. Data from previous research studies supports the use of direct inference instruction in fourth grade general education classrooms. In addition to the results of previous studies, the classroom teacher of the experimental group supports the use of the strategy

in future classrooms. The classroom teacher wrote a letter recommending the continued use of the inference strategy (Appendix F). Because s/he saw an increase in students' ability to make inferences, s/he recommends the strategy to other teachers and plans to use the strategy in the future. Contrary to the research results, the classroom teacher saw an increase in student motivation and students have even requested to continue using the strategy in the future.

Recommendations for Further Research

Based on the findings of this study, the following recommendations for future research are suggested:

1. This study should be replicated with a larger sample size to make the results more generalizable.
2. This study should be replicated while testing all students using an Informal Reading Inventory to determine comprehension gains or losses.
3. The study should be replicated with a different means of measuring motivation other than the Elementary Reading Attitude Survey.
4. The study should be replicated with a different means of measuring comprehension other than the Measures of Academic Progress and the Informal Reading Inventory.
5. This study should be replicated with other grade levels to determine how direct inference instruction affects students in other grades.
6. An experimental study should be conducted to examine struggling readers' inference abilities before and after implementation of explicit inference instruction.

Recommendations for Future Practice

Based on the findings of this study as well as existing research, the following recommendations for future practice are suggested:

1. It is suggested that teachers scaffold instruction of specific comprehension strategies.
2. It is suggested that teachers implement direct inference instruction in their classrooms within the context of reading.
3. It is suggested that teachers explain skills to students and allow them ample time to practice the skill.
4. It is suggested that teachers encourage students to connect their prior knowledge with the text.
5. It is suggested that teachers find highly motivating texts and materials to keep students engaged.

References

Allen, J. (1985). Inferential comprehension: The effects of text source, decoding ability, and mode. *Reading Reseach Quarterly, 20*(5), 603-615. doi:10.2307/747946

Brassell, D. & Rasinski, T. (2008). *Comprehension that works: Taking students beyond ordinary understanding to deep comprehension*. Huntington Beach, CA: Shell Education.

Cromley, J. G. & Azevendo, R. (2007). Testing and refining the direct and inferential mediation model of reading comprehension. *Journal of Educational Psychology, 99*(2), 311-325. doi:10.1037/0022-0663.99.2.311

Dewitz, P., Carr, E. M., & Patberg, J. P. (1987). Effects of inference training on comprehension and comprehension monitoring. *Reading Research Quarterly, 22*(1), 99-121. doi:10.2307/747723

Graesser, A. C., Singer, M., & Trabasso, T. (1994). Constructing inferences during narrative text comprehension. *Psychological Review, 101*(3), 371-395. doi:10.1047//0033-295x.101.3.371

Fritschmann, N. S., Deshler, D.D., & Schumaker, J. B. (2007). The effects of instruction in an inference strategy on the reading comprehension skills of adolescents with disabilities. *Learning Disabilities Quarterly, 30*(4), 245-262. doi:10.2307/25474637

Hansen, J. (1981). The effects of inference training and practices on young children's reading comprehension. *Reading Research Quarterly, 16*(3), 391-417. doi:10.2307/747409

Hansen, J. & Pearson, D. (1983). An instructional study: Improving the inferential comprehension of good and poor fourth-grade readers. *Journal of Educational Psychology, 75*(6), 821-829. doi:10.1037//0022-0663.75.6.821

Harris, T.L., & Hodges, R.E. (1995). *The literacy dictionary: The vocabulary of reading and writing.* Newark, DE: International Reading Association.

Harvey, S. & Goudvis, A. (2000). *Strategies that work: Teaching comprehension to enhance understanding.* Portland, ME: Stenhouse Publishers.

McMackin, M. C. & Witherell, N. L. (2005). Different routes to the same destination: Drawing conclusions with tiered graphic organizers. *The Reading Teacher 59*(3), 242-252. doi:10.1598/RT.59.3.4

McGee, A. & Johnson, H. (2003). The effect of inference training on skilled and less skilled comprehenders. *Educational Psychology, 23* (1), 49-59. dio:10.1080/0144341022000022924

McKenna, M. C. & Kear, D. J. (1990). Measuring attitude toward reading: A new tool for teachers. *The Reading Teacher, 43*(8), 626-239. doi:10.1598/RT.43.8.3

Miller, D. (2002). *Reading with meaning: Teaching comprehension in the primary grades*. Portland, ME: Stenhouse Publishers.

Narvaez, D., van den Broek, P., & Ruiz, A. B. (1999). The influence of reading purpose on inference generation and comprehension in reading. *Journal of Educational Phychology, 91(*3), 488-496. Retrevied from www.apa.org/pubs/journals/edu/index.aspx

National Institute of Child Health and Human Development (2001). *Put reading first: The research building blocks for teaching children to read.* Washington, DC: U.S. Government Printing Office.

National Institute of Child Health and Human Development (2000). *Report of the National Reading Panel. Teaching children to read: An evidence-based assessment of the scientific research literature on reading and its implications for reading instruction: Reports of the subgroups* (NHI Publication No. 00-4754). Washington, DC: U.S. Government Printing Office.

Northwest Evaluation Association (2011a). Measures of academic progress. Retrieved from http://www.nwea.org/

Northwest Evaluation Association (2011b). 2011 normative data. Retrieved from http://www.nwea.org/

Nokes, J. D. (2008). The observation/inference chart: Improving students' abilities to make inferences while reading nontraditional texts. *Journal of Adolescent & Adult Literacy, 51*(7), 538-546. doi: 10.1598/JAAL.51.7.2

Pardo, L. S. (2004). What every teacher needs to know about comprehension. *The Reaching Teacher, 58*(3), 272-280. doi: 10.1598/RT.58.3.5

Paris, S. G. & Lindauer, B. K. (1976). The role of inference in children's comprehension and memory for sentences. *Cognitive Psychology, 8*(2), 217-227. doi:10.1016/0010-0285(76)90024-4

Paris, S. G., Lindauer, B. K., Cox, G. L. (1977). The development of inferential comprehension. *Child Development, 48*(4), 1728-1733. doi:10.2307/1128546

Parker, M. & Hurry, J. (2007). Teachers' use of questioning and modelling comprehension skills in primary classrooms. *Educational Review, 59*(3), 299-314. doi:10.1080/00131910701427298

Pearson, P. D. (1985). Changing the face of reading comprehension instruction. *The Reading Teacher, 38*(8), 724-738. Retrieved from http://www.reading.org/General/Publications/Journals/RT.aspx

Pearson, P. D. & Dole, J. A. (1987). Explicit comprehension instruction: A review of research and a new conceptualization of instruction. *The Elementary School Journal, 88*(2), 151-165. doi:10.1086/461530

Pearson, P. D. & Gallagher, M. C. (1983). The instruction of reading comprehension. *Contemporary Educational Psychology, 8*(3), 317-344. doi:10.1016/0361-476X(83)90019-X

Pearson, P. D., Hansen, J., & Gordon, C. (1979). The effect of background knowledge on young children's comprehension of explicit and implicit information. *Journal of Literacy Research, 11*(3), 201-209. doi:10.1080/10862967909547324

Phillips, L. M. (1988). Young readers' inference strategies in reading comprehension. *Cognition and Instruction, 5*(3), 193-222. doi:10.1207/s1532690xci0503_1

Pillow, B. H. & Pearson, R. M. (2009). Children's and adult's evaluation of their own inductive inferences, deductive inference, and guesses. *Merrill-Palmer Quarterly, 55*(2), 135-156. Retrieved from http://www.asu.edu/clas/ssfd/mpq/

Raphael, T. E. (1982). Question-answering strategies for children. *The Reading Teacher, 36*(2), 186-190. Retrieved from www.reading.org/General/Publications/Journals/RT.aspx

Richards, J. C. & Anderson, N. A. (2003). How do you know? A strategy to help emergent readers make inferences. *The Reading Teacher, 57*(3), 290-293. Retrieved from http://www.reading.org/General/Publications/Journals/RT.aspx

Roe, B. D. & Burns, P. C. (2007). *Informal reading inventory: Preprimer to twelfth grade.* Boston, MA: Houghton Mifflin Company.

Sakamoto, Y. & Love, B. C. (2010). Learning and retention through predictive inference and classification. *Journal of Experimental Psychology, 16*(4), 361-377. doi:10.1037/a0021610

Sundbye, N. (1987). Text explicitness and inferential questioning: Effects on story understanding and recall. *Reading Research Quarterly, 22*(1), 82-98. doi:10.2307/747722

Wixson, K. K., Peters, C. W., Weber, E. M., & Roeber, E. D. (1987). New directions in statewide reading assessment. *The Reading Teacher, 40*(8), 749-754. Retrieved from www.reading.org/General/Publications/Journals/RT.aspx

Yuill, N. & Joscelyne, T. (1988). Effect of organizational cues and strategies on good and poor comprehenders' story understanding. *Journal of Educational Psychology, 80*(2), 152-158. doi:10.1037//0022-0663.80.2.152

Appendix A

Informal Reading Inventory

◇ 4 PASSAGE ◇ FORM A ◇ TEACHER 4 ◇

INTRODUCTORY STATEMENT: Matthew had been going to the library and reading there because it was a quiet place. Then the library was closed until a new one could be built. Read this story to find out what Matthew did.

On the corner, one block away from the closed library, Matthew saw the long green bookmobile. He walked up to the truck, climbed the three little steps, and walked inside. A girl who looked a little like Claudia took his book from him. The woman from the library was standing next to her, stamping books for people to take home. She smiled when she saw Matthew. "Look at the titles," she said. "I'll come over as soon as I can and help you find a book you'll like."

Matthew smiled back and walked around the bookmobile, looking for the children's section. There were other people walking around, too. They were all close together because there wasn't a lot of room. The books were lined up against the wall on shelves. When you walked around them, you couldn't find a place to be by yourself. Matthew saw that he couldn't stay at the bookmobile the way he could at a real library. So when he came to the children's section, he looked through the shelves and tried to find a book as fast as he could. He looked at the titles and all the bright book covers. His eyes fell on a book with a picture of a boy on it. The boy had brown skin just like Matthew's, and he looked about the same age. Matthew thought it would be nice to read a book about a boy who looked so much like himself. He picked it up and took it to the librarian. She said, "You picked out a really good book." Then she took his card and stamped the book.

Source: "A Quiet Place," by Rose Blue, in Leo Fay and others, *Star Show* (Chicago: The Riverside Publishing Company, 1989), pp. 212–213.

[*Note*: Do not count as miscues mispronunciation of the names Matthew and Claudia. You may pronounce these names for the student if needed.]

SCORING AID

Word Recognition
%–Miscues
99–3
95–13
90–25
85–36

Comprehension
%–Errors
100–0
90–1
80–2
70–3
60–4
50–5
40–6
30–7
20–8
10–9
00–10

237 Words
(for Word Recognition)

244 Words
(for Rate)

WPM
14640

COMPREHENSION QUESTIONS

____ main idea	1. What is this story about? (Matthew visits the bookmobile because the library is closed; Matthew makes his first visit to the bookmobile.)
____ detail	2. Where did Matthew see the bookmobile? (on the corner; one block away from the library)
____ vocabulary	3. What is a bookmobile? (a library in a truck or bus or van)
____ cause and effect/ inference	4. Why did Matthew go to the bookmobile? (He had a book to turn in and wanted another one and the library was closed.)
____ inference	5. Was the librarian friendly? (yes) What did the story say that made you think that? (She smiled at Matthew and offered to help him.)
____ sequence	6. What was the first thing Matthew looked for after he returned his book? (the children's section)
____ inference	7. Was the bookmobile crowded? (yes) What did the story say that made you think that? (People were close together; there wasn't a lot of room; there was no place to be by yourself.)
____ detail	8. What two things did Matthew look at to help him pick out a book? (the titles and the book covers)
____ vocabulary	9. What does the phrase "his eyes fell on a book" mean? (He saw a book.)
____ inference	10. What did Matthew look like? (He had brown skin.)

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Appendix B

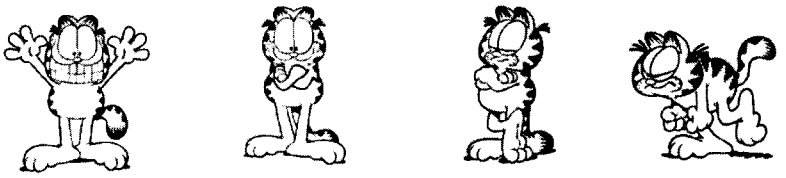
Elementary Reading Attitude Survey

Elementary Reading Attitude Survey

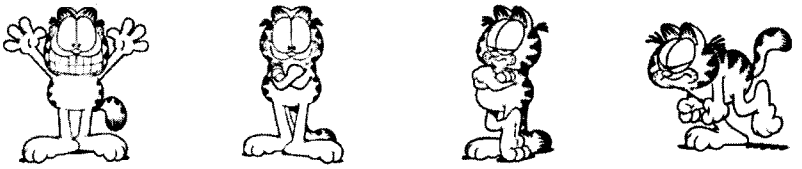
School_____ Grade_____ Name_____

Please circle the picture that describes how you feel when you read a book.

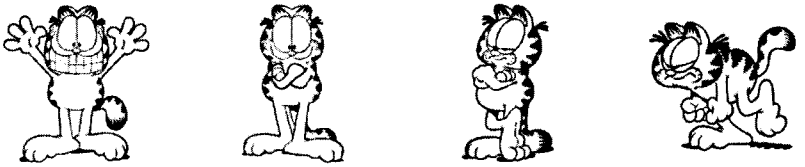
1. How do you feel when you read a book on a rainy Saturday?



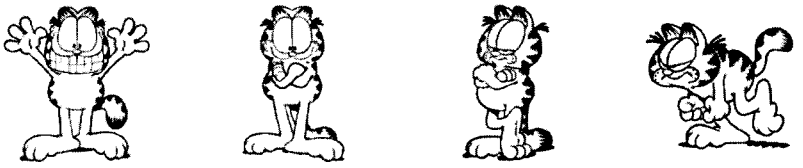
2. How do you feel when you read a book in school during free time?



3. How do you feel about reading for fun at home?



4. How do you feel about getting a book for a present?



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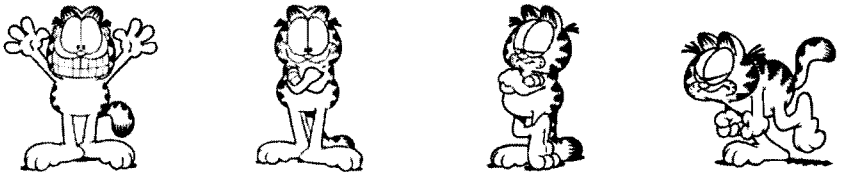
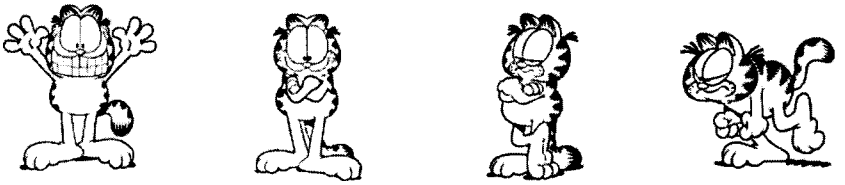
Survey designed by Dennis J. Kear, Wichita State University

Please circle the picture that describes how you feel when you read a book.

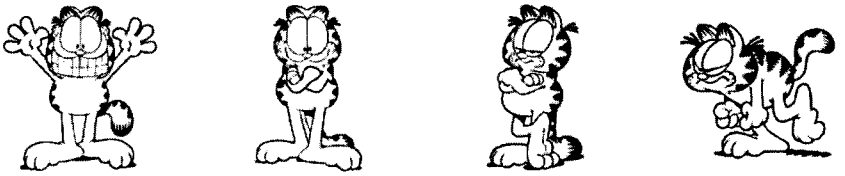
5. How do you feel about spendng free time reading a book?



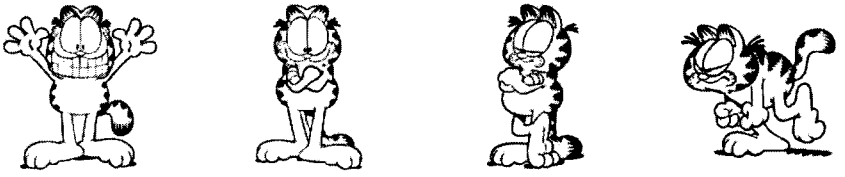
6. How do you feel about starting a new book?



7. How do you feel about reading during summer vacation?



8. How do you feel about reading instead of playing?



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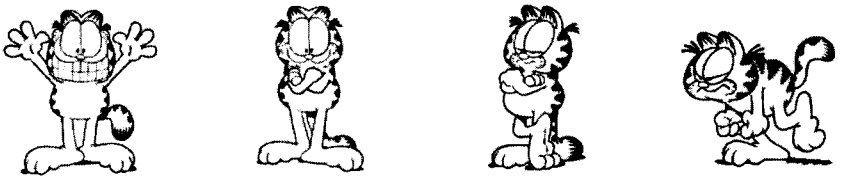
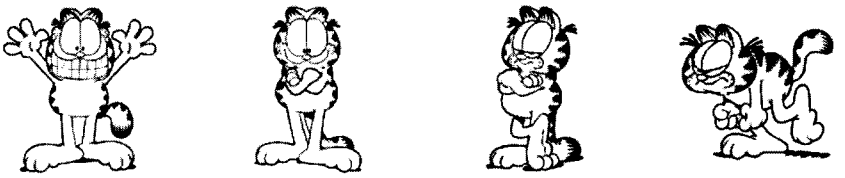
Please circle the picture that describes how you feel when you read a book.

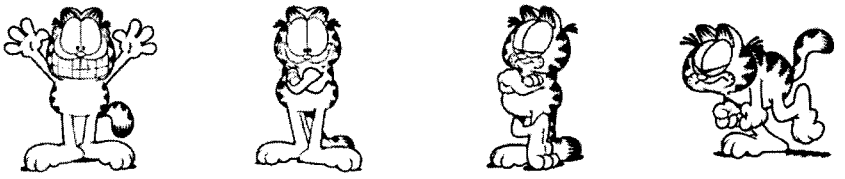
9. How do you feel about going to a bookstore?



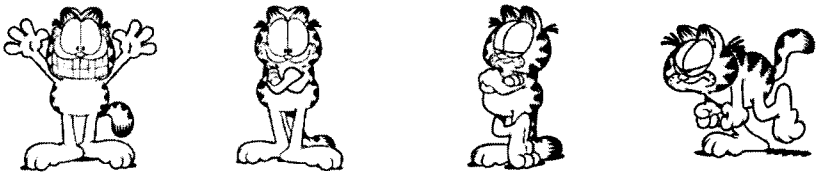
10. How do you feel about reading different kinds of books?



11. How do you feel when a teacher asks you questions about what you read?



12. How do you feel about reading workbook pages and worksheets?



Page 3

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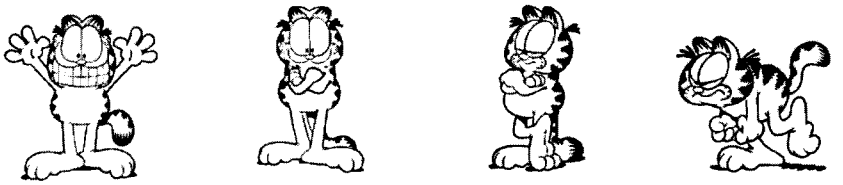
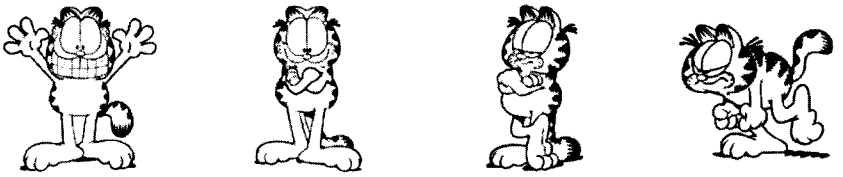
Please circle the picture that describes how you feel when you read a book.

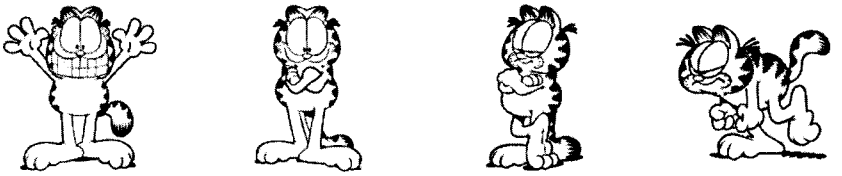
13. How do you feel about reading in school?



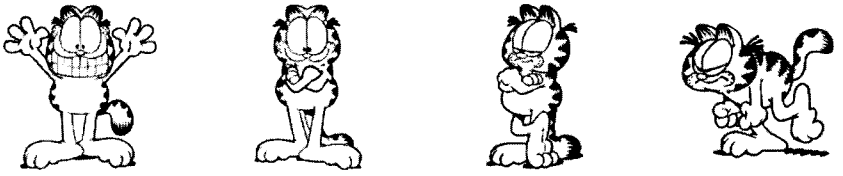
14. How do you feel about reading your school books?



15. How do you feel about learning from a book?



16. How do you feel when it's time for reading in class?



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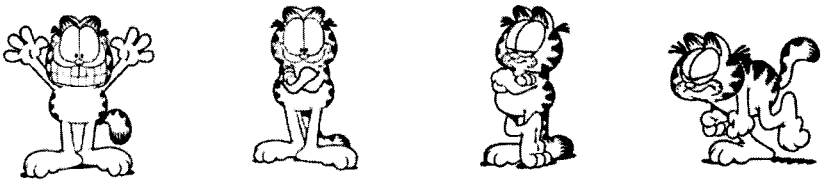
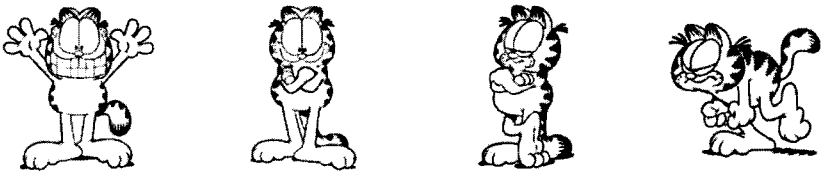
Please circle the picture that describes how you feel when you read a book.

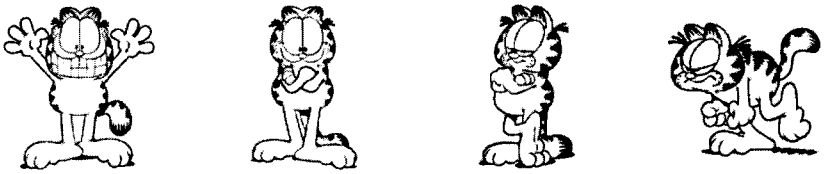
17. How do you feel about stories you read in reading class?



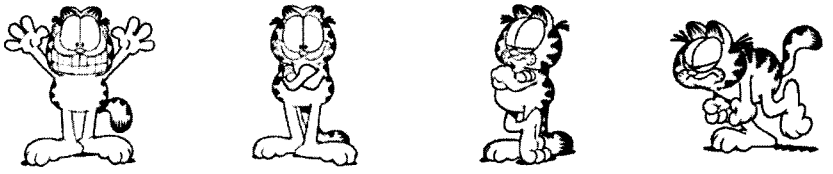
18. How do you feel when you read out loud in class?



19. How do you feel about using a dictionary?



20. How do you feel about taking a reading test?



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© PAWS – www.professorgarfield.org
Survey designed by Dennis J. Kear, Wichita State University

Appendix C

Letter to Parents of Fourth Grade Students

Dear Parent or Guardian,

Your child is invited to participate in a research study conducted by myself, Kalee Bengtson, under the supervision of my thesis director,Dr. Daniel Carter, from the Department of Early Childhood, Elementary, and Middle Level Education at Eastern Illinois University. I will be conducting a research study in your child's classroom as a requirement to complete my master's degree. The research study will look at the effects of direct inference instruction on students' reading comprehension as well as motivation and interest in reading. I am sending you this letter to provide you with information about the study. Also, I am requesting your permission to allow your child to participate in this study under the guidance of my thesis director and with the permission of your child's principal, (Principal's Name).

If you agree to your child's participation in the research study, he or she will be provided with direct instruction on an inference strategy to be employed during reading. In order to directly teach inferences in class, your child's teacher will explain why and how to infer while reading through a strategy developed specifically for this research study. Students in participating classrooms will be asked both literal and inferential questions following the reading of a text and will also complete a graphic organizer to answer the questions and find, in the text, where the author explicitly states the answer (in literal questions such as "Who was the main character?") or where the author hints at the answer (in inferential questions such as "Why did the main character act the way he/she did?"). Your child will also be asked to answer reading comprehension questions following at least four reading passages from an Informal Reading Inventory and will be asked to complete the (Garfield) Reading Attitude Survey, a nationally recognized survey. Your child's scores of the Measures of Academic Progress (MAP) test, an assessment used by (School Name), as well as the Illinois Standards Achievement Test (ISAT), an assessment used throughout the state of Illinois,will also be analyzed in the study.

Because the study will be incorporating a reading strategy as well as commonly used reading assessments, the risks associated with this study are minimal. Students participating in the study may benefit from the strategy by an increase in their reading comprehension as well as heightened motivation and interest in reading. Teachers participating in the study will gain a better understanding of successful strategies and learn to implement a reading strategy that may be beneficial to their students.

Throughout the study, any information collected about your child will remain confidential. The researcher, thesis director, and thesis committee members will be the only individuals with access to the data; information will only be disclosed with your permission. The data will be kept in a locked file cabinet. All students will be given a code so that the students' names will not be associated with the data obtained.

Participation in this study is voluntary and not a requirement or a condition for being the recipient of benefits or services from Eastern Illinois University or any other organization sponsoring the research project. If you agree to have your child involved in this study,

you may withdraw your consent at any time without consequences of any kind or loss of benefits or services to which you are otherwise entitled. In order to withdraw your consent, please send a written statement indicating your withdrawal of consent to the principal investigator, Kalee Bengtson at:

Kalee Bengtson
Reading Center 1320
Buzzard Building
Eastern Illinois University
600 Lincoln Ave.
Charleston, IL 61920

Please read the attached form. If you agree to have your child participate in the study, no further action is necessary. If you do not wish for your child to participate in the study, please return the second page of the consent form to your child's teacher by Wednesday, September 28. Your response will be kept as a record to document your wishes regarding your child's participation in this study. This letter may be retained for your records.

Sincerely,

Kalee Bengtson

Appendix D

Consent Form

DIRECT INFERENCE INSTRUCTION

Principal Investigator: Kalee Bengtson

This document is to certify that the research project and my child's role in the research project have been fully explained to me in writing by Kalee Bengtson, and I understand her explanation as well as what will be expected of my child by virtue of his/her participation in this study.

I understand that all data will remain confidential with regard to my child's identity.

I understand that my child's participation in this study is entirely voluntary and not a requirement or a condition for being the recipient of benefits or services from Eastern Illinois University or any other organization sponsoring the project.

I understand that the approximate duration of this research project will be eight weeks, but all of my child's participation will take place within his/her classroom setting and involve fifteen minutes of actual data collection time per student.

I understand that if I have any questions or concerns about the treatment of human participants in this study, I may call or write:

Institutional Review Board
Eastern Illinois University
600 Lincoln Ave.
Charleston, IL 61920
Telephone: (217) 581-8576
E-mail: eiuirb@www.eiu.edu

Although the respondent will ask my name, I understand that all inquiries will be kept in the strictest confidence.
I understand that if I have any questions concerning the purposes or procedures associated with this research project, I may call or write:

Kalee Bengtson
Reading Center 1320
Buzzard Building
Eastern Illinois University
600 Lincoln Ave.
Charleston, IL 61920

Telephone: (217)581-7898
Email: kareinoehl@eiu.edu

I also understand that it will not be necessary to reveal my name in order to obtain additional information about this research project from the principal investigator.

I FURTHER UNDERSTAND THAT I AM FREE TO WITHDRAW MY CONSENT AND DISCONTINUE MY CHILD'S PARTICIPATION AT ANY TIME.

This document is to certify that I, _____, hereby refuse to grant consent for my child, _____, to participate in this study.

_____ _____
(Signature of Child's Parent or Guardian) (Date)
If you agree to have your child participate in this study, no further action is necessary.

Appendix E

Explanation of Assent Process to Fourth Grade Students

ASSENT TO PARTICPATE IN RESEARCH
(as explained by the researcher)

My name is Kalee Bengtson and I am a graduate student at Eastern Illinois University. I will be conducting a research study in your classroom as a requirement to complete my master's degree. The research study will look at the effects of direct inference instruction on students' reading comprehension as well as motivation and interest in reading. I would like to give you information about the study and ask you to participate.

If you participate in this study you will read. Your teacher will explain why and how to infer while reading through a strategy developed specifically for this research study. You will be asked both literal and inferential questions following the reading of a text and will also complete a graphic organizer to answer the questions and find, in the text, where the author explicitly states the answer (in literal questions such as "Who was the main character?") or where the author hints at the answer (in inferential questions such as "Why did the main character act the way he/she did?"). You will also be asked to answer reading comprehension questions following at least four reading passages from an Informal Reading Inventory and will be asked to complete the (Garfield) Reading Attitude Survey, a nationally recognized survey. These assessments will be done during class time. Your scores of the Measures of Academic Progress (MAP) test, as well as the Illinois Standards Achievement Test (ISAT) will also be analyzed in the study.

Any information obtained during this study will remain confidential and will be shared only with your permission. Your name will be removed from all data collected for the study by me, the researcher. You will be assigned a code, and the only person who will have this information will be me, the researcher. The only people who will see your responses will be my teachers which include my faculty sponsor and thesis committee members.

Before you decide to participate in the study, please remember it is your choice. You will not be punished if you choose not to participate or if you decide to stop participating.

If you agree to participate in the study I described to you, please mark the "yes" box on the slip of paper provided to you. If you do not agree to participate in the study I described to you, please mark the "no" box on the slip of paper provided to you. Please print your name on the paper. When you have marked the paper, please fold it in half and wait for me to collect it from you. Your decision will remain confidential.

Please feel free to ask any questions about the study now or at any time. Your teacher will have my contact information if you wish to write or email me. Thank you very much for your time.

Your participation in this research study is voluntary. If you agree to participate in this study, you may stop at any time. If you withdraw from the study, you will not be penalized or lose services that you would normally receive in the classroom. If at any

time you wish to withdraw from the study, please send a written statement indicating that you no longer wish to participate in the study to me through your reading teacher.

In order for you to take part in the study, your parents/guardians had to provide their consent, and a form was sent home explaining the process. If they did not want you to participate in the study, a signed form was returned.

Appendix F

Letter from Classroom Teacher

To whom it may concern,

During the fall of 2011, my 4th Grade classroom participated in a study focused on teaching students about making inferences while reading and working with questions.

I am confident that students' ability to infer was increased through participation in this research and the use of the strategy in my classroom. Students were familiarized with the terms and concept of inferring and were shown through modeling and guided practice how to use inference to increase their reading comprehension. Following the study, I have observed an increased level of students' ability to recognize when and how they must infer a question.

I plan to continue using this strategy to supplement the regular reading instruction within my classroom. I found the focus on inference to be a valuable addition to my reading instruction. The graphic organizer used throughout the lessons taught students to use their own experiences as well as the author's information to answer comprehension questions. The pacing and sequence of the instruction eased students into the concept; they saw inference modeled, began to participate in the process, and gradually began answering and posing their own inference questions.

Students were generally motivated to participate in the instruction – they enjoyed looking for clues and details from the author and were eager to share their own connections and experiences. The resources we worked with, including the interactive whiteboard files and well-chosen books, also contributed to student engagement. Students were also motivated to answer questions when filling out the graphic organizer and when answering and posing questions. After the study, several students asked to continue using the strategy because they enjoyed the style of the lessons.

As a whole, motivation to read independently seemed unchanged by participation in this instruction, though I found most students generally liked reading before and continued to like reading after.

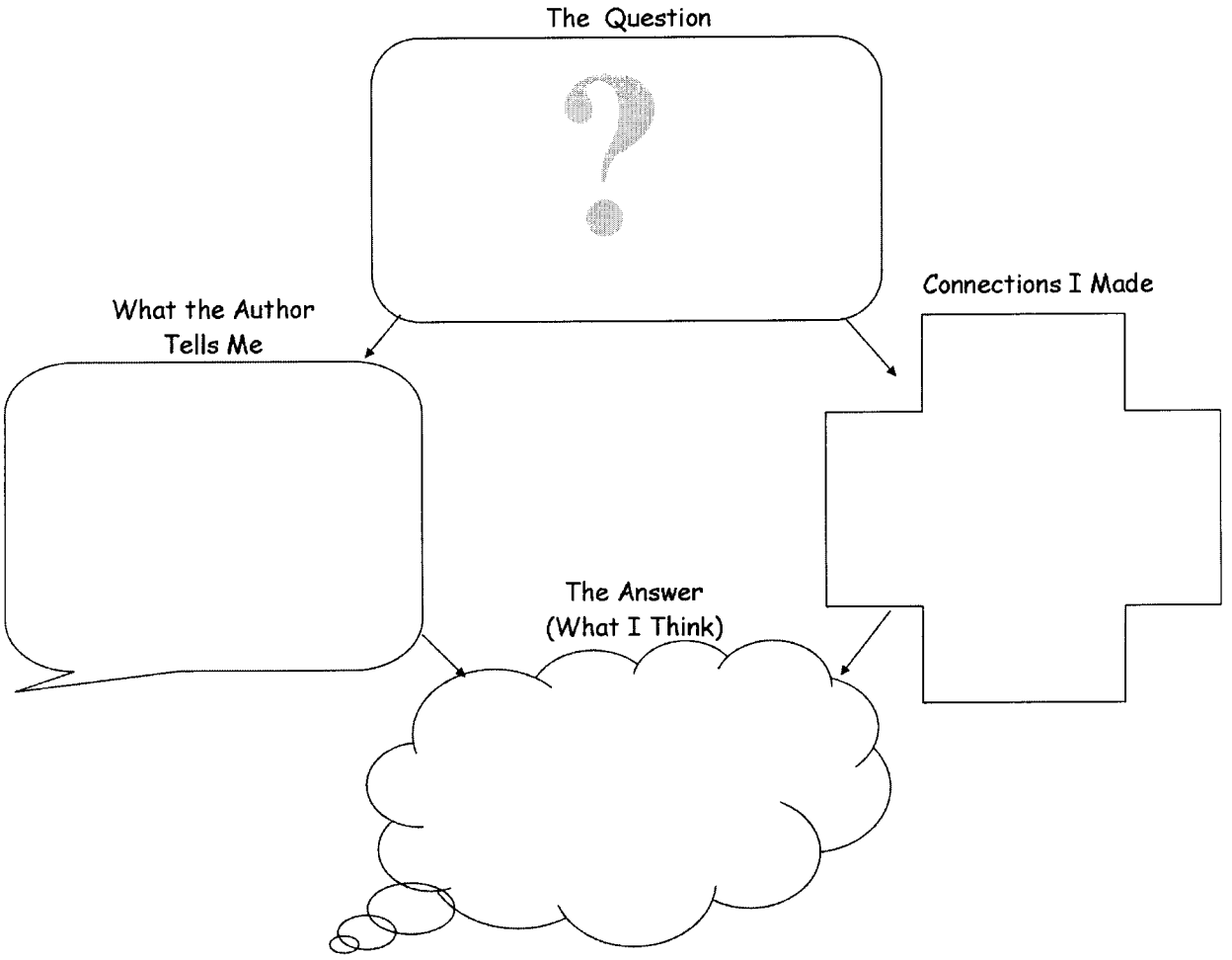
I believe that students at a higher reading level had an easier time understanding the concept of inference throughout the study. From my observations, students at a higher reading level were more participatory and able to apply the strategies taught. Students at lower reading levels had a harder time with the strategies, particularly when working independently.

Overall, I would recommend this strategy to other teachers without reservation. I believe the strategies and lessons my students experienced as part of this study had a positive influence on the students' reading comprehension skills, particularly in regard to their ability to infer as they read and work with text.

Sincerely,
(Teacher's Name)
4th Grade Teacher

Appendix G

Graphic Organizer


The Question
What the Author Tells Me
Connections I Made
The Answer (What I Think)